Some Objectives and Methods for Surveying
(1) Aspen, Willow, and Cottonwood Browse;
(2) Aspen Stand Structure; and
(3) Springs Conditions
in Ten Mile, Pine Creek/Sulphurbeds, and Cottonwood Allotments
2008

1. **ASPEN STANDS**
   - **a. Objectives of Survey**
     - i. Survey the percent of unbrowsed, browsed, or otherwise damaged leaders on aspen ≤6' in upland stands where aspen is dominant.
     - ii. Survey aspen height classes (and DBH for aspen >6' tall) in upland stands where aspen is dominant
     - iii. Qualitatively relate stand conditions and settings to unbrowsed/browsed status of these riparian plants.
     - iv. Gather data for what is otherwise a data gap (i.e., browsing status in aspen-dominant stands not recently logged or burned) in the Forest's monitoring of allotments.
     - v. Compare browse/height class status in Ten Mile and Pine Creek/Sulphurbeds allotments (cattle plus wild ungulates) with Cottonwood allotment (wild ungulates)
     - vi. Gather data that may shed some light on relative contributions of wild ungulate and cattle to aspen, willow, and cottonwood browse

   - **b. Methods**

     For each aspen-only or aspen-dominant stand surveyed in Ten Mile, Pine Creek/Sulphurbeds, and Cottonwood Allotments:
     - i. Draw map and make management notes ("Aspen_Stand_Map_and_Notes[2]")
     - ii. Aspen Browsing/Damage: Three 100', 6-foot-wide belt transects for measuring aspen browse/damage ("Form_Aspen_Regeneration[3]" and "Aspen_Damage_Codes[2]")

       For laying of stratified random sampling and restricted random sampling transects, see USFS, Pacific SW Region. 2004. *Browsed Plant Method for Young Quaking Aspen*
     - iii. Aspen Stand Condition/Structure: Two 100 m^2 rapid condition/structural assessments (radius 18.4 feet, or 5.62 m) ("Form_Aspen_Stand_Structure[3]")

       This involves only slight modifications of the methods used in the study posted on the Tushar Allotments Collaboration website http://tushar.ecr.gov/pdf/map_aspenstructure_Rapidassementreport.pdf
     - iv. Supplement with GPS-linked digital photos

   - **c. What can / will be learned using this method?**
     - **i.** We can learn about which aspen stands have multiple layers (e.g., young aspen, aspen growing toward overstory, overstory aspen, snags), and which are missing one or more of the above layers.
     - **ii.** We can learn about the proportion of young aspen sprouts being prevented from recruiting into overstory due to browse.

iii. We can learn something about browsing by elk (e.g., in Cottonwood allotment, or in the NW corner of Ten Mile allotment, where cattle don't congregate) and browsing in areas used both by cattle and elk.
iv. We can learn something qualitative about the nature and health of the aspen understory community – i.e., how are the grasses, forbs, and shrubs doing beneath the aspen? Is the understory dominated by exotic species? Mesic or dry-land species?
v. Digital photos with their GPS location will provide specific points that can be revisited at any time by others.

d. How will what we learn relate to the final report (i.e., existing or desired conditions, management practices)?

i. This information is critical to the question of whether and which aspen-dominated stands are at risk for being eliminated from the landscape.
ii. This information relates to the desired conditions for aspen stands --- as aspen only, or aspen as a community of aspen, forbs, grasses and shrubs?
iii. This relates to the question of whether aspen are being subjected to too many ungulate (elk and cattle) mouths.
iv. This may relate to where water developments are placed.

2. RIPARIAN WILLOW/COTTONWOOD/ASPEN BROWSE

a. Objectives of Survey

i. Determine the percent of unbrowsed, browsed, or otherwise damaged leaders on riparian area aspen and cottonwood, and willow along a portion of creeks in Ten Mile, Pine Creek/Sulphurbeds, and Cottonwood Allotments.
ii. Determine the heights (to nearest foot) of willow species, including those that would not be expected to reach above browse height at maturity
iii. Gather data on the ability/inability of aspen, cottonwood, and willow to exceed browse height for reproduction (i.e., flowering units above browse height) and riparian vegetation structure.
iv. Qualitatively relate riparian area conditions to unbrowsed/browsed status of these riparian plants.
v. Compare browse status in Ten Mile and Pine Creek/Sulphurbeds allotment (cattle plus wild ungulates) with Cottonwood allotment (wild ungulates)
vi. Gather some data for what is otherwise a data gap in the Forest's monitoring of allotments: riparian area willow, cottonwood and aspen browse

b. Methods

i. ("Form_AspenCottonWillow_Riparian_Browse[4]" and "Aspen_Damage_Codes[2]")
ii. Determine species of willow; retain plant specimen(s).
iii. Lay down 100' transect tape straight along edge of creek with beginning of the transect tape at location where willow/cottonwood/aspen is(are) present.
iv. Measure browse on willow, cottonwood and/or aspen within five 6'-wide belt transects perpendicular to creek, with 20' between transects.

v. The location of the first 6'-wide belt transect is within 10' of the beginning of the 100' tape as determined via a random number table (0-10)
vi. The length of each 6'-wide belt transect is determined by the distance the cottonwood/willow/aspen extend back from the creek, up to 100'. For instance, if cottonwood and/or willow extend 50' back from the creek, the transect will be 50' long. If no willow or cottonwood are present further than 13' back from the creek, the transect will be 13' long, from creek edge to the last willow or cottonwood.
vii. Willows 0'-6' tall: Measure browse/damage condition of leaders within 6" height of the tallest leader, and within a 12" diameter hoop.
viii. Willows >6' tall: Record plant width at breast height.
ix. Cottonwood/aspen 0'-6' tall: Tallest leader and "sub-leaders" within 6" of tallest leader are recorded for browse/damage condition.
x. Cottonwood/aspen >6' tall: DBH recorded
xi. Supplement with GPS-linked digital photos and key notes on the Form.

c. What can / will be learned using this method?

i. This method will provide a good picture of the presence and condition of various riparian aspen, cottonwood, and willow classes (e.g., big and old; mature; young).
ii. It will provide a sense of the width of current riparian vegetation compared to past riparian width (e.g., if old trees exist farther away from the creek than any young willows, cottonwood or aspen).
iii. The method will give a sense of the effects of browsing on the aspen, willow, and cottonwood in various riparian areas. For instance, are willow being suppressed relative to their potential height? Are their reproductive parts present? Are their particular creeks or reaches where willow are flourishing? If so, what are the circumstances that are allowing for this health?

d. How will what we learn relate to the final report (i.e., existing or desired conditions, management practices)?

i. If desired conditions include healthy, complex riparian vegetation, then these surveys will help us understand the current condition of aspen, willow, and cottonwood in the riparian areas.
ii. Willow and cottonwood are key sources of biodiversity in the Southwest. Their presence, suppression, and/or absence has implications for management of elk and cattle, and in conjunction with ORVs and other motorized vehicles, and dispersed camping in the same riparian areas.
iii. Willow, cottonwood, and/or aspen are required by beaver. What management will provide for beaver presence, e.g., in Pine Creek?
iv. If particular creeks or creek reaches are being depleted of cottonwood, willow, and/or aspen, this does not bode well for the stability of the stream. What management practices will allow for stream/creek recovery?

3. SPRINGS

a. Objectives of Survey

i. Describe the presence and ecological conditions of a sample of undeveloped vs. developed springs and associated wetlands on the Ten Mile, Pine Creek/Sulphurbeds, and Cottonwood allotments.

ii. Qualitatively describe animal sign at the springs
iii. Qualitatively relate springs conditions to their locations and surrounding activities
iv. Attempt to locate springs that are functioning naturally.

b. Method

i. Qualitatively describe the type and ecological conditions of springs and their associated wetlands, both developed and natural, on the Ten Mile, Pine Creek/Sulphurbeds, and Cottonwood allotments ("Form_Springs_survey[3]")
ii. Supplement with GPS-linked digital photos and a sketch of the spring(s).

c. What can / will be learned using this method?

i. This will be a "level 1" survey that will describe any natural springs that are found.
ii. We will learn the degree to which particular developed springs are being allowed to retain any natural features
iii. We will learn how some of the allotments' springs connect with their surrounding landscape (e.g., roads, wetlands, creeks, meadows)

d. How will what we learn relate to the final report (i.e., existing or desired conditions, management practices)

i. As springs can have plants and animals uniquely associated with them, this information should feed into a discussion of desired conditions for springs within the two allotments.
ii. Similarly, springs are variously the source of water for tributaries, wetlands, creeks, and meadows. The survey will feed into a discussion of desired conditions for spring/landscape connections.